QUESTIONS AND ANSWERS ABOUT. . .

National Institute of Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse

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SPRAINS AND STRAINS

This fact sheet contains general information about sprains and strains, which are both very common injuries. Individual sections describe what sprains and strains are, where they usually occur, what their signs and symptoms are, how they are treated, and how they can be prevented. At the end is a list of key words to help you understand the terms used in the fact sheet. If you have further questions, you may wish to discuss them with your doctor.

What Is the Difference Between a Sprain and a Strain?

A sprain is an injury to a ligament—a stretching or a tearing. One or more ligaments can be injured during a sprain. The severity of the injury will depend on the extent of injury to a single ligament (whether the tear is partial or complete) and the number of ligaments involved.

A strain is an injury to either a muscle or a tendon. Depending on the severity of the injury, a strain may be a simple overstretch of the muscle or tendon, or it can result in a partial or complete tear.

What Causes a Sprain?

A sprain can result from a fall, a sudden twist, or a blow to the body that forces a joint out of its normal position. This results in an overstretch or tear of the ligament supporting that joint. Typically, sprains occur when people fall and land on an outstretched arm, slide into base, land on the side of their foot, or twist a knee with the foot planted firmly on the ground.

Where Do Sprains Usually Occur?

Although sprains can occur in both the upper and lower parts of the body, the most common site is the ankle. Ankle sprains are the most common injury in the United States and often occur during sports or recreational activities. Approximately 1 million ankle injuries occur each year, and 85 percent of them are sprains.

The talus bone and the ends of two of the lower leg bones (tibia and fibula) form the ankle joint (see fig. 1). This joint is supported by several lateral (outside) ligaments and medial (inside) ligaments. Most ankle sprains happen when the foot turns inward as a person runs, turns, falls, or lands on the ankle after a jump. This type of sprain is called an inversion injury. One or more of the lateral ligaments are injured, usually the anterior talofibular ligament. The calcaneofibular ligament is the second most frequently torn ligament.

The knee is another common site for a sprain. A blow to the knee or a fall is often the cause; sudden twisting can also result in a sprain (see fig. 2).

Sprains frequently occur at the wrist, typically when people fall and land on an outstretched hand.

Figure 1. Lateral View of the Ankle

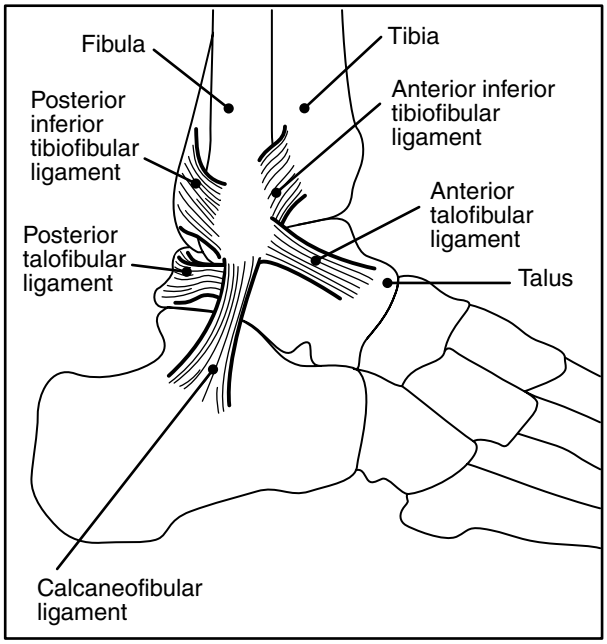
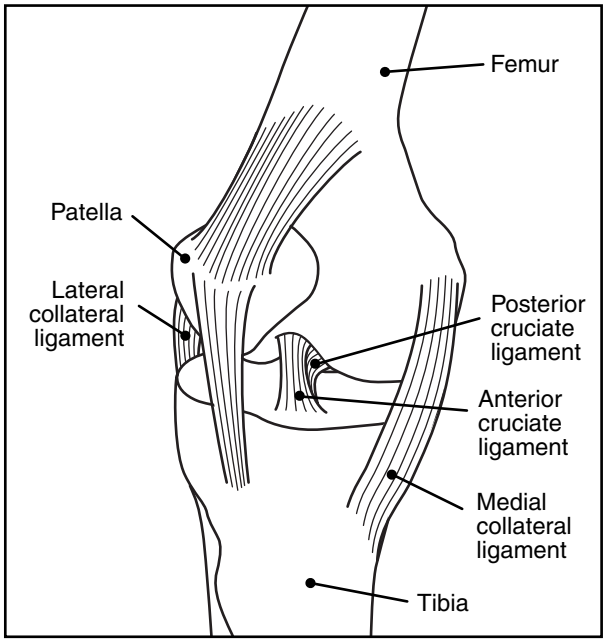


Figure 2. Lateral View of the Knee



What Are the Signs and Symptoms of a Sprain?

The usual signs and symptoms include pain, swelling, bruising, and loss of the ability to move and use the joint (called functional ability). However, these signs and symptoms can vary in intensity, depending on the severity of the sprain. Sometimes people feel a pop or tear when the injury happens.

Doctors use many criteria to diagnose the severity of a sprain. In general, a grade I or mild sprain causes overstretching or slight tearing of the ligaments with no joint instability. A person with a mild sprain usually experiences minimal pain, swelling, and little or no loss of functional ability. Bruising is absent or slight, and the person is usually able to put weight on the affected joint. People with mild sprains usually do not need an x ray, but one is sometimes performed if the diagnosis is unclear.

When To See a Doctor for a Sprain

- You have severe pain and cannot put any weight on the injured joint.
- The area over the injured joint or next to it is very tender when you touch it.
- The injured area looks crooked or has lumps and bumps (other than swelling) that you do not see on the uninjured joint.
- You cannot move the injured joint.
- You cannot walk more than four steps without significant pain.
- Your limb buckles or gives way when you try to use the joint.
- You have numbness in any part of the injured area.
- You see redness or red streaks spreading out from the injury.
- You injure an area that has been injured several times before.
- You have pain, swelling, or redness over a bony part of your foot.
- You are in doubt about the seriousness of the injury or how to care for it.

A grade II or moderate sprain causes partial tearing of the ligament and is characterized by bruising, moderate pain, and swelling. A person with a moderate sprain usually has some difficulty putting weight on the affected joint and experiences some loss of function. An x ray may be needed to help the doctor determine if a fracture is causing the pain and swelling. Magnetic resonance imaging is occasionally used to help differentiate between a significant partial injury and a complete tear in a ligament.

People who sustain a grade III or severe sprain completely tear or rupture a ligament. Pain, swelling, and bruising are usually severe, and the patient is unable to put weight on the joint. An x ray is usually taken to rule out a broken bone.

When diagnosing any sprain, the doctor will ask the patient to explain how the injury happened. The doctor will examine the affected joint and check its stability and its ability to move and bear weight.

What Causes a Strain?

A strain is caused by twisting or pulling a muscle or tendon. Strains can be acute or chronic. An acute strain is caused by trauma or an injury such as a blow to the body; it can also be caused by improperly lifting heavy objects or overstressing the muscles. Chronic strains are usually the result of overuse—prolonged, repetitive movement of the muscles and tendons.

Where Do Strains Usually Occur?

Two common sites for a strain are the back and the hamstring muscle (located in the back of the thigh). Contact sports such as soccer, football, hockey, boxing, and wrestling put people at risk for strains. Gymnastics, tennis, rowing, golf, and other sports that require extensive gripping can increase the risk of hand and forearm strains. Elbow strains sometimes occur in people who participate in racquet sports, throwing, and contact sports.

What Are the Signs and Symptoms of a Strain?

Typically, people with a strain experience pain, muscle spasm, and muscle weakness. They can also have localized swelling, cramping, or inflammation and, with a minor or moderate strain, usually some loss of muscle function. Patients typically have pain in the injured area and general weakness of the muscle when they attempt to move it. Severe strains that partially or completely tear the muscle or tendon are often very painful and disabling.

How Are Sprains and Strains Treated?

Reduce Swelling and Pain

Treatment for sprains and strains is similar and can be thought of as having two stages. The goal during the first stage is to reduce swelling and pain. At this stage, doctors usually advise patients to follow a formula of rest, ice, compression, and elevation (RICE) for the first 24 to 48 hours after the injury (see the box below). The doctor may also recommend an over-the-counter or prescription nonsteroidal anti-inflammatory drug, such as aspirin or ibuprofen, to help decrease pain and inflammation.

RICE THERAPY

Rest

Reduce regular exercise or activities of daily living as needed. Your doctor may advise you to put no weight on an injured area for 48 hours. If you cannot put weight on an ankle or knee, crutches may help. If you use a cane or one crutch for an ankle injury, use it on the uninjured side to help you lean away and relieve weight on the injured ankle.

Ice

Apply an ice pack to the injured area for 20 minutes at a time, 4 to 8 times a day. A cold pack, ice bag, or plastic bag filled with crushed ice and wrapped in a towel can be used. To avoid cold injury and frostbite, do not apply the ice for more than 20 minutes.

Compression

Compression of an injured ankle, knee, or wrist may help reduce swelling. Examples of compression bandages are elastic wraps, special boots, air casts, and splints. Ask your doctor for advice on which one to use.

Elevation

If possible, keep the injured ankle, knee, elbow, or wrist elevated on a pillow, above the level of the heart, to help decrease swelling.

For people with a moderate or severe sprain, particularly of the ankle, a hard cast may be applied. Severe sprains and strains may require surgery to repair the torn ligaments, muscle, or tendons. Surgery is usually performed by an orthopaedic surgeon.

It is important that moderate and severe sprains and strains be evaluated by a doctor to allow prompt, appropriate treatment to begin. The box on page 3 lists some signs that should alert people to consult their doctor. However, a person who has any concerns about the seriousness of a sprain or strain should always contact a doctor for advice.

Begin Rehabilitation

The second stage of treating a sprain or strain is rehabilitation, whose overall goal is to improve the condition of the injured part and restore its function. The health care provider will prescribe an exercise program designed to prevent stiffness, improve range of motion, and restore the joint's normal flexibility and strength. Some patients may need physical therapy during this stage.

When the acute pain and swelling have diminished, the health care provider or physical therapist will instruct the patient to do a series of exercises several times a day. These are very important because they help reduce swelling, prevent stiffness, and restore normal, pain-free range of motion. The health care provider can recommend many different types of exercises, depending on the injury. For example, people with an ankle sprain may be told to rest their heel on the floor and write the alphabet in the air with their big toe. A patient with an injured knee or foot will work on weight-bearing and balancing exercises. The duration of the program depends on the extent of the injury, but the regimen commonly lasts for several weeks.

Another goal of rehabilitation is to increase strength and regain flexibility. Depending on the patient's rate of recovery, this process begins about the second week after the injury. The health care provider or physical therapist will instruct the patient to do a series of exercises designed to meet these goals. During this phase of rehabilitation, patients progress to more demanding exercises as pain decreases and function improves.

The final goal is the return to full daily activities, including sports when appropriate. Patients must work closely with their health care provider or physical therapist to determine their readiness to return to full activity. Sometimes people are tempted to resume full activity or play sports despite pain or muscle soreness. Returning to full activity before regaining normal range of motion, flexibility, and strength increases the chance of reinjury and may lead to a chronic problem.

The amount of rehabilitation and the time needed for full recovery after a sprain or strain depend on the severity of the injury and individual rates of healing. For example, a moderate ankle sprain may require 3 to 6 weeks of rehabilitation before a person can return to full activity. With a severe sprain, it can take 8 to 12 months before the ligament is fully healed. Extra care should be taken to avoid reinjury.

Can Sprains and Strains Be Prevented?

There are many things people can do to help lower their risk of sprains and strains:

- Maintain a healthy, well-balanced diet to keep muscles strong.
- Maintain a healthy weight.
- Practice safety measures to help prevent falls (for example, keep stairways, walkways, yards, and driveways free of clutter, and salt or sand icy patches in the winter).
- Wear shoes that fit properly.
- Replace athletic shoes as soon as the tread wears out or the heel wears down on one side.
- Do stretching exercises daily.
- Be in proper physical condition to play a sport.
- Warm up and stretch before participating in any sports or exercise.
- Wear protective equipment when playing.
- Avoid exercising or playing sports when tired or in pain.
- Run on even surfaces.

Where Can People Find More Information About Sprains and Strains?

- National Institute of Arthritis and Musculoskeletal and Skin Diseases
  Information Clearinghouse
  NIAMS/National Institutes of Health
  1 AMS Circle
  Bethesda, MD 20892–3675
  301/495–4484
  TTY: 301/565–2966
  Fax: 301/718–6366
  World Wide Web address: http://www.nih/gov/niams/

The clearinghouse provides information on arthritis and musculoskeletal and skin diseases. Additional information and updates can also be found on the NIAMS Web site.

- American Academy of Orthopaedic Surgeons
  P.O. Box 2058
  Des Plaines, IL 60017
  800–824–BONE (2663)
  World Wide Web address: http://www.aaos.org/

The academy provides education and practice management services for orthopaedic surgeons and allied health professionals. It also serves as an advocate for improved patient care and informs the public about the science of orthopaedics. The orthopaedist's scope of practice includes disorders of the body's bones, joints, ligaments, muscles, and tendons. For a single copy of an AAOS brochure, send a self-addressed stamped envelope to the address above or visit the AAOS Web site.

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The mission of the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), a part of the National Institutes of Health (NIH), is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases, the training of basic and clinical scientists to carry out this research, and the dissemination of information on research progress in these diseases. The National Institute of Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse is a public service sponsored by the NIAMS that provides health information and information sources. Additional information can be found on the NIAMS Web site at www.nih.gov/niams.

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Key Words

Acute: An illness or injury that lasts for a short time and may be intense.

Chronic: An illness or injury that lasts for a long time.

Femur: The upper leg or thigh bone, which extends into the hip socket at its upper end and down to the knee at its lower end.

Fibula: The thin, outer bone of the leg that forms part of the ankle joint at its lower end.

Inflammation: A characteristic reaction of tissues to disease or injury; it is marked by four signs: swelling, redness, heat, and pain.

Joint: A junction where two bones meet.

Ligament: A band of tough, fibrous tissue that connects two or more bones at a joint and prevents excessive movement of the joint.

Muscle: Tissue composed of bundles of specialized cells that contract and produce movement when stimulated by nerve impulses.

Range of motion: The arc of movement of a joint from one extreme position to the other; range-of-motion exercises help increase or maintain flexibility and movement in muscles, tendons, ligaments, and joints.

Tendons: Tough, fibrous cords of tissue that connect muscle to bone.

Tibia: The thick, long bone of the lower leg (also called the shin) that forms part of the knee joint at its upper end and the ankle joint at its lower end.